Remarks

Support for the Amendments and Status of the Claims

Support for the foregoing amendments to claims 1 and 192, and for new claims 193-195 can be found throughout the specification, including throughout Example 1. Therefore, these amendments do not introduce new matter, and their entry and consideration are respectfully requested.

By the foregoing amendments, claims 1 and 192 are sought to be amended and new claims 193-195 are sought to be added. Upon entry of the foregoing amendments, claims 1-16, 93-101, 106-107, 112-133, 138-159, 162, 164-167, 169-171, 173-175, 177-178, 181-186, 188 and 192-195 are pending in the application, with claim 1 being the sole independent claim. Claims 12-16, 93-101, 106-107, 112-133, 138-140, 142-159, 162, 165, 167, 171 and 175 have been withdrawn from consideration.

Summary of the Office Action

In the Office Action dated December 29, 2005, the Examiner has made two rejections of the claims. Applicants respectfully offer the following remarks to traverse each of these elements of the Office Action. Applicants respectfully request reconsideration of the present Application.

First Rejection Under 35 U.S.C. § 112, First Paragraph

In the Office Action at pages 4-7, section 12, the Examiner has rejected claims 1-11, 141, 164, 166, 169, 170, 173, 177, 178, 181-186, 188 and 192 under 35 U.S.C. § 112,

first paragraph, as allegedly failing to comply with the written description requirement. Applicants respectfully traverse this rejection.

Specifically, the Examiner states that the "specification disclosure does not sufficiently teach the claimed array wherein the kinases are derived from ***any*** mammal or ***any*** Drosophila." Office Action at page 5, second paragraph (emphasis in original). In addition, the Examiner states that, "[w]ith the exception of a yeast protein kinase array, wherein the array comprises 122 different yeast kinases, disclosed by the specification, the skilled artisan cannot envision the claimed array wherein the kinases [are] derive[d] from ***any*** mammal or ***any*** Drosophila." Office Action at page 6, first full paragraph (emphasis in original). Applicants respectfully disagree with the Examiner.

In support of the assertions that the specification fails to provide adequate written description for the claimed subject matter, the Examiner cites *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555 (Fed. Cir. 1991) for the proposition that specification must "clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed." *Vas-Cath* 935 F.2d at 1563 (quoting *In re Gosteli*, 872 F.2d 1008, 1012 (Fed. Cir. 1989) (alterations in original)).

The Examiner also cites other cases in which the Board or the Federal Circuit has addressed the written description requirement in the context of biotechnology. The Examiner cites *Fiers v. Revel,* 984 F.2d 1164 (Fed. Cir. 1993) and *Amgen Inc. v. Chugai Pharmaceutical Co. Ltd.*, 927 F.2d 1200 (Fed. Cir. 1991) after asserting that "[a]dequate written description requires more than a mere statement that [DNA] is part of the invention and reference to a potential method for making and using it." Office Action at page 6, first full paragraph. The Examiner also cited *Fiddes v. Baird*, 30 U.S.P.Q. 2d

1481(B.P.A.I. 1993), where, according to the Examiner, the Board held that claims directed to mammalian FGFs (fibroblast growth factors) were unpatentable "due to lack of written description for the broad class [of mammalian FGFs]." Office Action at page 6, first paragraph. Finally, the Examiner quotes from *Regents of the University of California v. Eli Lilly and Co.*, 119 F.3d 1559 (Fed. Cir. 1997), in which the Federal Circuit discussed what was, at the time, the status of the written description requirement as it related to biotechnology.

Applicants respectfully disagree with the Examiner's assertion that the specification fails to provide written description for the currently pending claims, in view of the cited case law. As stated in Applicants' previously-filed reply dated September 19, 2005, the contents of which are incorporated by reference herein, the cases cited by the Examiner do not support the conclusion that the present specification does not adequately describe the claimed invention. As stated in the previous reply, the claims at issue in the cases cited by the Examiner were directed towards novel DNA or protein *molecules themselves*, where the identity of the molecule was *unknown* prior to the filing date of the patents at issue, rather than methods or compositions *utilizing well-known and well-characterized class of proteins*, as in the presently claimed invention.

Applicants respectfully submit that the presently claimed invention is not directed to DNA sequences or proteins themselves, and the claim terms here do not utilize "new or unknown biological materials that the ordinarily skilled artisan would easily miscomprehend." *See, e.g., Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1332 (Fed. Cir. 2003), ("[the] Eli Lilly [decision] . . . [is] inapposite to this case because the claim terms at issue here are not new or unknown biological materials that ordinarily

skilled artisans would easily miscomprehend."). Rather, the claims of the pending application are directed towards arrays comprising kinases or functional kinase domains thereof. The sufficiency of the disclosure in supporting the currently pending claims, therefore, must be analyzed in light of a "positionally addressable array," rather than kinases, which were a well known class of proteins as of the filing date of the present application. Applicants assert that, when viewed in the proper context, the specification fully describes the claimed subject matter as it relates to an array comprising kinases or functional kinase domains thereof.

In response to Applicants' arguments made in the previously-filed reply, the Examiner states:

> First although the cited case laws directed to DNA compounds, these cases laws would be deemed applicable to any *compound or a generic/genus of compounds*, which requires a representative sample of compounds and/or a showing of sufficient identifying characteristics to demonstrate possession of the compound or generics/genus. . . . In this case, the pending claims are directed to the *genus of protein kinase* of the genus of eukaryotes and prokaryotes, i.e. the organism of mammal, yeast and Drosophila.

Office Action at page 11, first paragraph (emphasis added)

Applicants respectfully submit that, contrary to the Examiner's assertions, the presently claimed invention is not directed to a compound or genus of protein kinases. Rather, present independent claim 1 is directed to "a positionally addressable array" which comprises protein kinases, or functional kinase domains thereof, positioned on a solid support. The presently claimed invention simply utilizes protein kinases and/or functional kinase domains in the construction of an array, and is not directed to a nucleic acid or protein sequence, much less an *unknown, previously uncharacterized* nucleic acid

or protein sequence, the focus of the subject matter of the case law cited by the Examiner. Rather, the protein kinases and functional kinase domains for use in the presently claimed invention are all well-known, well-characterized proteins that the ordinarily skilled artisan would easily comprehend. *See, Amgen v. Hoechst*, 314 F.3d at 1332.

For example, in *Hanks, S.K. and Hunter, T., FASEB J.*, 9:576-596 (1995), the authors state that, as of 1995, "there are now hundreds of different members [of the kinase superfamily] whose sequences are known." *Hanks and Hunter*, page 576. Furthermore, kinases, for example serine kinases, were already readily recognized in 1995 by virtue of their conserved subdomains. *Hanks and Hunter*, page 576 (abstract). Indeed, Figure 1 of *Hanks and Hunter* depicts the conserved features of the kinase domain primary structure, even though the sequences are "drawn . . . from the widest possible sampling of the superfamily, and thus provide a good representation of the known primary structures." *Hanks and Hunter*, page 577-587. Furthermore, methods that could be used to confirm kinase activity were well known as of the filing date of the present application (*see e.g.*, Example 1 of present specification). Thus protein kinases, and functional kinase domains thereof, were well-known in the art at the time of filing the present application.

The written description requirement must be viewed in light of the state of the art at the time of filing. *Capon v. Eshhar,* 418 F.3d 1349, 1358 (Fed Cir. 2005). Applicants submit that, when viewed in light of the state of the art at the time of filing the present application, the specification fully supports the presently claimed invention, because kinases from not only yeast, but also from any mammal or any Drosophila could be

readily recognized, based on the well-known conserved structural motifs of the hundreds of known kinases as of the filing date of the pending application. As the Federal Circuit has recently stated, "[t]he descriptive text needed to meet these [written description] requirements varies with the nature and scope of the invention at issue, and with the scientific and technologic knowledge already in existence." *Id.* at 1357.

As noted in Applicants' previously-filed reply, *Capon* clarifies the written description requirement as delineated by *Fiers, Amgen v. Chugai* and *Eli Lilly.* In discussing the current state of the written description requirement under 35 U.S.C. §112, first paragraph, the Federal Circuit stated "[s]ince the law is applied to each invention *in view of the state of relevant knowledge*, its application will vary with differences in the state of knowledge in the field . . . ." *Id.* (emphasis added). In reviewing and overturning the Board's decision, the Federal Circuit held that "[t]he Board erred in refusing to consider the state of scientific knowledge . . . ." *Id.* Furthermore, the Federal Circuit stated that the Board's reliance on *Eli Lilly, Fiers, Amgen v. Chugai* and *Enzo* for the case at bar was incorrect and explained that "[n]one of the cases to which the Board attributes the requirement of total DNA re-analysis, *i.e.*, *Regents v. Lilly, Fiers v. Revel, Amgen* [*v. Chugai*], *or Enzo Biochem*, require a re-description of what was already known." *Id.*

Furthermore, the Federal Circuit stated:

> The "written description" requirement states that the patentee must describe the invention; it does not state that every invention must be described in the *same way*. As each field evolves, the balance also evolves between what is known and what is added by each inventive contribution. Both Eshhar and Capon explain that this invention does not concern the discovery of gene function or structure, as in *Lilly*. The chimeric genes here at issue are prepared from *known* DNA sequences of *known* function. The Board's

> requirement that these sequence must be analyzed and reported in the specification *does not add descriptive substance.*

Id. at 1358 (emphasis added). As in *Capon*, the presently claimed invention does not concern the discovery of gene function or structure. The proteins utilized in the present invention are a *known* class of proteins, kinases and functional kinase domains, with *known* functions. Describing every kinase or functional kinase domain that can be used in the practice of the present invention would not add descriptive substance to the present application, and hence is not required under *Capon*. *Id.*

The Examiner has stated that the 122 protein kinases disclosed in the present invention:

> [I]s not the definitive total number of protein kinases in a yeast genome since it is a predicted number. . . . Since there is no definitive total number of protein kinase for a yeast genome, i.e. the genus of protein kinases with a single species of yeast, the specification clearly does not provide an adequate representation regarding the genus of protein kinase of the genus of eukaryotes and prokaryotes, i.e. the organism of mammal, yeast and Drosophila.

Office Action at page 11. Applicants respectfully submit that the presently claimed invention is directed to positionally addressable arrays, *not* to an unknown genus of proteins. Applicants are not required to describe a family of proteins (i.e., kinases) that are well known in the art. Rather, as noted in *Capon*, when the prior art includes the relevant information, "precedent does not set a *per se* rule that the information must be determined afresh." *Capon,* 418 F.3d at 1358. Even assuming *arguendo* that the Examiner is correct, and that "there is no definitive total number of protein kinase for a yeast genome," Applicants are not required to disclose every protein kinase, as they are not claiming unknown kinases, rather they are claiming positionally addressable arrays

that *comprise* kinases or functional kinase domains. The ordinarily skilled artisan would readily understand based on the knowledge of the structure of kinases or functional domains thereof, that any kinase could be utilized in the practice of the present invention. Examples 1-5 in the present specification disclose the use of one genus of kinases or functional kinase domains, kinases of the yeast genome, that are useful in the practice of the presently claimed invention. This description of at least one representative species of kinases or functional kinase domains, especially when considering that the present invention is directed to positionally addressable arrays, not isolated kinases, satisfies the holding of *Lilly*, as clarified by *Capon*, and provides sufficient written description such that the ordinarily skilled artisan would determine that the inventors, at the time the application was filed, had full possession of the claimed invention. (*See also*, *Invitrogen Corp. v. Clontech Lab., Inc.*, 429 F.3d 1052, 1073 (Fed. Cir. 2005) holding that description of a single species is sufficient written description for claims directed to a modified polypeptide having DNA polymerase activity.)

In support of this conclusion, Applicants respectfully submit that kinases and functional kinase domains thereof were well known in the art as of 1995. *See Hanks and Hunter*, *supra*. Furthermore, one of skill in the art could even review the DNA sequence of a coding sequence or amino acid sequence of a novel protein and easily determine that the coding sequence coded for a kinase or that the novel protein was, in fact, a kinase, based on these well-known structural motifs and publicly available nucleotide and protein sequence information. These well-known motifs could be used to identify additional mammalian kinases and Drosophila kinases from at least those motifs specifically identified on or after the publication *Hanks and Hunter* in 1995, well before

the priority date of the present application. For example, in Morrison, D.K., *et al., J. Cell Bio.*, 150(2):F57-62 (July, 2000), the authors were able to identify approximately 251 Drosophila kinases, based on analyzing the Drosophila genome using automated gene predictor methods, and comparing sequences to the kinase structural motif. The Drosophila genome was published *prior* to the filing date of the application and was thus part of the state of scientific knowledge at the time of filing the present application. *See* Adams, M.D., *et al, Science*, 287:2185-2195 (2000) (copy enclosed).

Also illustrative of the state of art at the time of or before the filing of the present application, Plowman *et al., Proc. Natl. Acad. Soc.*, 96:13603-13610 (November 1999), submitted with the previously-filed reply, discloses specific bioinformatics tools that were used to identify kinases from genomic information of *C. elegans* using the well-known conserved kinase structural motifs to identify 411 worm kinases. The authors also used these same bioinformatics tools to assess publicly available expressed sequence tag data to identify 592 human kinases. (*Plowman et al., 13604, left column and Table 1*). Accordingly, using bioinformatics tools, such as those disclosed in Plowman *et al.* and Morrison *et al.* in conjunction with the publicly available sequence information, a skilled artisan would recognize that, as of the filing date of the present application, the sequences of virtually any kinase from any mammal or any Drosophila were either readily available or easily identifiable. Applicants assert, therefore, that the state of the art as of the filing date of the present application was such that one of skill in the art would be able to recognize a DNA sequence encoding a kinase or a kinase amino acid sequence from any mammal or any Drosophila, without further guidance from the present specification. Accordingly, Applicants believe that the present specification

adequately and sufficiently describes the presently claimed subject matter in view of the state of the art at the time the application was filed. Reconsideration and withdrawal of this rejection are respectfully requested.

Second Rejection Under 35 U.S.C. § 112, First Paragraph

In the Office Action at pages 7-9, section 13, the Examiner has rejected claims 1-11, 141, 164, 166, 169, 170, 173, 177, 178, 181-186, 188 and 192 under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Applicants respectfully traverse this rejection.

The Examiner contends that "[t]he specification disclosure does not sufficiently teach the claimed array wherein the plurality of different substances is kinase analogue (refers to the limitation of '*molecules comprising functional domains thereof*'), and these analogs are derived from ***any*** mammal, ***any*** yeast, or ***any*** Drosophila." Office Action at page 7, third paragraph (emphasis in original). Applicants respectfully disagree with the Examiner's contentions.

The Examiner further states:

> [I]t is the examiner position that the pending claims are '*directed towards novel DNA or proteins*' as claimed in claim 1. Claim 1 recited the limitation of '*the plurality of different substances consists of at least 61 kinases* ***or molecules comprising functional domains thereof*** *of an organism*'. The limitation of '***or molecules comprising functional domains thereof***' encompasses known and unknown, i.e. novel, DNA and proteins.

Office Action at page 14, second paragraph (emphasis in original).

Present claim 1 (and hence, the remaining claims that depend ultimately therefrom and that are also rejected under 35 U.S.C. § 112, first paragraph) recites

"wherein the plurality of different substances comprises 61 kinases or functional kinase domains thereof of an organism selected from the group consisting of a mammal, yeast, and Drosophila." Applicants respectfully submit that the presently claimed invention is directed to a known and structurally and functionally characterized class of proteins, protein kinases, or functional kinase domains *thereof* (i.e., domains of the structurally characterized class of proteins, (i.e., protein kinases)). As discussed throughout, the ordinarily skilled artisan, at the time of filing of the present invention, would not only have recognized a great number of kinases known in the art, but also would have been able to determine which domains of such proteins were functional kinase domains through routine experimentation (*see also*, Example 1 of the present specification).

As discussed above, Applicants respectfully submit that the present specification, when viewed in light of the state of scientific knowledge at the time of filing, clearly adequately supports the claimed invention. Specifically, as discussed above, the structural motifs of kinases were well known prior to filing the present application. In fact, functional domains of kinases are the motifs that define the group and give them their functional activity. *See Hanks and Hunter, supra.* Furthermore, the functional kinase domains were very well understood with respect to their structure as of the filing date of the present application. *See Hanks and Hunter, supra.*

Applicants also submit that the Examiner's reliance on *Fiers, Amgen v. Chugai, Fiddes and Eli Lilly* is misplaced, in view of recent Federal Circuit case law that clarifies the written description requirement, *See Capon* and *Amgen v. Hoechst.* Accordingly, in light of the state of scientific knowledge at the time of filing the present application, and in view of Federal Circuit precedent that states that "re-description of what [is] already

known" is not required for adequate written description, Applicants respectfully submit that the present specification fully supports the claimed invention as it relates to "functional kinase domains," from any mammal or any Drosophila. Reconsideration and withdrawal of this rejection are respectfully requested.

Conclusion

All of the stated grounds of rejection have been properly traversed, rendered moot or otherwise overcome. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn.

Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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